

WHAT IS CLAIMED IS:

1. An image reproducing method for reproducing an image by a display apparatus having a plurality of pixels based on a picture signal including a pixel signal representing information of each pixel, comprising the steps of:

performing an operation to obtain an average signal level which is an average level of all the pixel signals, then, setting an input signal - output brightness property which represents variations in brightness of a pixel with respect to the level of a pixel signal in accordance with the average signal level; and

reproducing an image so as to satisfy the input signal - output brightness property thus set.

2. The method as set forth in Claim 1, wherein:

an image is reproduced so that an exponential value in which the input signal - output brightness property is approximately represented by an exponential function becomes larger as the average signal level increases.

3. The method as set forth in Claim 1, wherein:

when the pixel signal includes a brightness signal representing brightness information of each pixel, the average signal level is obtained by performing an

operation to obtain an average level of all the brightness signals.

4. The method as set forth in Claim 3, wherein:

in order to reproduce the image based on the picture signal including a brightness signal subject to compensation, the input signal - output brightness property which represents variations in brightness of a pixel with respect to the level of the brightness signal is set in accordance with the average signal level, and compensation is performed on the brightness signal so as to satisfy the input signal - output brightness property thus set.

5. The method as set forth in Claim 1, wherein:

the image is reproduced by performing compensation on the picture signal so as to satisfy the input signal - output brightness property that is set, and outputting the picture signal subject to compensation to the display apparatus.

6. The method as set forth in Claim 5, wherein:

the input signal - output brightness property is set by performing an operation to obtain an exponential value in which the input signal - output bright property is

approximately represented by an exponential function, and

compensation for the picture signal is made by performing compensation of the picture signal according to an input signal - output brightness property corresponding to the input signal - output brightness property that is set, thereafter compensating for deviation from a linear property of the input signal - output brightness property of the display apparatus.

7. The method as set forth in Claim 6, wherein:

the compensation for deviation from the linear property of the input signal - output brightness property of the display apparatus is performed by converting the pixel signal by an inverse function of a function which represents the input signal - output brightness property of the display apparatus.

8. The method as set forth in Claim 1, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including a brightness signal which represents brightness information of each pixel and a chromaticity signal which represents chromaticity information of each pixel.

9. The method as set forth in Claim 1, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.

10. The method as set forth in Claim 1, further comprising the step of reproducing the image so that maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level.

11. The method as set forth in Claim 10, wherein the image is reproduced so that the maximum output brightness becomes small as the average signal level increases.

12. The method as set forth in Claim 10, wherein:

in order to reproduce the image, an operation to obtain the maximum output brightness of a pixel of the display apparatus is performed according to the average signal level, then, compensation is further performed on the picture signal subject to the compensation according to the input signal - output brightness property that is set, based on a result of the operation for the maximum output brightness, and the picture signal subject to this compensation is outputted to the display apparatus.

13. The method as set forth in Claim 12, wherein:

as the display apparatus is adopted a display apparatus having an emission type optical switching element in which an emission element functions as an optical switching element as well.

14. The method as set forth in Claim 10, wherein:

the image is reproduced so that an exponential value in which the input signal - output brightness property is approximately represented by an exponential function becomes larger as the average signal level increases, and the maximum output brightness becomes smaller as the average signal level increases.

15. The method as set forth in Claim 10, wherein:

when the pixel signal includes a brightness signal which represents brightness information of each pixel, the operation for the average signal level is made by performing an operation to obtain an average level of all the brightness signals.

16. An image reproducing method for reproducing an image by a display apparatus having a plurality of pixels based on a picture signal including a pixel signal representing information of each pixel, wherein:

an image is reproduced so that, after performing an operation to obtain an average signal level which is an average level of all the pixel signals, maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level.

17. The method as set forth in Claim 16, wherein the image is reproduced so that the maximum output brightness becomes smaller as the average signal level increases.

18. The method as set forth in Claim 16, wherein:

when the pixel signal includes a brightness signal representing brightness information of each pixel, the operation for the average signal level is made by performing an operation to obtain an average level of all the brightness signals.

19. The method as set forth in Claim 16, wherein:

when the pixel signal to be employed in the operation for the average signal level is a color video signal including a brightness signal which represents brightness information of each pixel and a chromaticity signal which represents chromaticity information of each pixel.

20. The method as set forth in Claim 16, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.

21. The method as set forth in Claim 16, wherein:

as the display apparatus is adopted a display apparatus having an emission element and a non-emission type optical switching element, which is capable of separately controlling the emission element and the optical switching element.

22. An image display apparatus which includes a display section having a plurality of pixels for displaying an image and receives a picture signal including a pixel signal representing information of each pixel, comprising:

an average signal level operation section for performing an operation to obtain an average signal level which is an average level of all the pixel signals;

an input signal - output brightness property setting section for setting an input signal - output brightness property which represents variations in brightness of a pixel with respect to a level of the pixel signal in

accordance with the average signal level; and

a signal compensation section for performing compensation of a picture signal so as to satisfy the input signal - output brightness property thus set.

23. The image display apparatus as set forth in Claim 22, wherein:

the input signal - output brightness property setting section sets an exponential value in which the input signal - output brightness property is approximately represented by an exponential function, so as to become larger as the average signal level increases.

24. The image display apparatus as set forth in Claim 22, wherein:

the average signal level operation section performs an operation to obtain an average signal level which is an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel.

25. The image display apparatus as set forth in Claim 24, wherein:

the input signal - output brightness property



setting section sets an input signal of brightness - output brightness property which represents variations in brightness of a pixel with respect to a level of the brightness signal in the pixel signal in accordance with the average signal level, and

the signal compensation section performs compensation of the picture signal so as to satisfy the input signal of brightness - output brightness property thus set.

26. The image display apparatus as set forth in Claim 22, further comprising:

a delay section for delaying output of the pixel signal of the inputted picture signal to the signal compensation section by time required to perform the operation for the average signal level and to set the input signal - output brightness property.

27. The image display apparatus as set forth in Claim 22, wherein:

the input signal - output brightness property setting section sets the input signal - output brightness property by performing an operation to obtain an exponential value in which the input signal - output brightness property is approximately represented by an

exponential function, in accordance with the average signal level, and

the signal compensation section includes a first signal compensation for performing compensation of the pixel signal according to an input signal - output brightness property which corresponds to the input signal - output brightness property that is set, by an operation adopting the exponential value, and a second signal compensation section for performing compensation for deviation from a linear property of the input signal - output brightness property of the display section.

28. The image display apparatus as set forth in Claim 27, wherein:

the second signal compensation section converts the pixel signal by an inverse function of a function representing the input signal - output brightness property of the display section.

29. The image display apparatus as set forth in Claim 22, wherein:

the pixel signal to be employed in the operation for the average signal level is a color video signal which includes a brightness signal representing brightness information of each pixel and a chromaticity signal

representing chromaticity information of each pixel.

30. The image display apparatus as set forth in Claim 22, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.

31. The image display apparatus as set forth in Claim 22, further comprising:

a maximum output brightness adjustment section for adjusting maximum output brightness of a pixel of the display section in accordance with the average signal level.

32. The image display apparatus as set forth in Claim 31, wherein:

the maximum output brightness adjustment section adjusts maximum output brightness so as to become smaller as the average signal level increases.

33. The image display apparatus as set forth in Claim 31, wherein:

the input signal - output brightness property

setting section sets an exponential value in which the input signal - output brightness property is approximately represented by an exponential function, so as to become larger as the average signal level increases, and

the maximum output brightness adjustment section adjusts maximum output brightness so as to become smaller as the average signal level increases.

34. The image display apparatus as set forth in Claim 33, further comprising:

an emission type optical switching element in which an emission element functions as an optical switching element as well.

35. The image display apparatus as set forth in Claim 31, wherein:

the average signal level operation section performs an operation to obtain an average signal level which is an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel.

36. The image display apparatus as set forth in Claim 31, wherein:

the pixel signal to be employed in the operation for the average signal level is a color video signal which includes a brightness signal representing brightness information of each pixel and a chromaticity signal representing chromaticity information of each pixel.

37. The image display apparatus as set forth in Claim 31, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.

38. An image display apparatus which includes a display section having a plurality of pixels for displaying an image and receives a picture signal including a pixel signal representing information of each pixel, comprising:

an average signal level operation section for performing an operation to obtain an average signal level which is an average level of all the pixel signals; and

a maximum output brightness adjustment section for adjusting maximum output brightness of a pixel of a display section in accordance with the average signal level.

39. The image display apparatus as set forth in Claim 38, wherein:

the maximum output brightness adjustment section adjusts maximum output brightness so as to become smaller as the average signal level increases.

40. The image display apparatus as set forth in Claim 38, wherein:

the average signal level operation section performs an operation to obtain an average signal level which is an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel.

41. The image display apparatus as set forth in Claim 38, further comprising an emission element and a non-emission type optical switching element, which are separately controlled.

42. An picture signal compensation device which receives a picture signal including a pixel signal representing information of each pixel, and performs compensation of the picture signal so as to output the pictures signal subject to compensation to a display apparatus having a plurality of pixels, comprising:

an average signal level operation section for performing an operation to obtain an average signal level which is an average level of all the pixel signals;

an input signal - output brightness property setting section for setting an input signal - output brightness property which represents variations in brightness of a pixel with respect to a level of the pixel signal in accordance with the average signal level; and

a signal compensation section for performing compensation of a picture signal so as to satisfy the input signal - output brightness property thus set.

43. The picture signal compensation device as set forth in Claim 42, wherein:

the input signal - output brightness property setting section sets an exponential value in which the input signal - output brightness property is approximately represented by an exponential function, so as to become larger as the average signal level increases.

44. The picture signal compensation device as set forth in Claim 42, wherein:

the average signal level operation section performs an operation to obtain an average signal level which is

an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel.

45. The picture signal compensation device as set forth in Claim 42, wherein:

the input signal - output brightness property setting section sets an input signal of brightness - output brightness property which represents variations in brightness of a pixel with respect to a level of the brightness signal in the pixel signal in accordance with the average signal level, and

the signal compensation section performs compensation of the picture signal so as to satisfy the input signal of brightness - output brightness property thus set.

46. The image display apparatus as set forth in Claim 42, further comprising:

a delay section for delaying output of the pixel signal of the inputted picture signal to the signal compensation section by time required to perform the operation for the average signal level and to set the input signal - output brightness property.



47. The picture signal compensation device as set forth in Claim 42, wherein:

the input signal - output brightness property setting section sets the input signal - output brightness property by performing an operation to obtain an exponential value in which the input signal - output brightness property is approximately represented by an exponential function, in accordance with the average signal level, and

the signal compensation section includes a first signal compensation for performing compensation of the pixel signal according to an input signal - output brightness property which corresponds to the input signal - output brightness property that is set, by an operation adopting the exponential value, and a second signal compensation section for performing compensation for deviation from a linear property of the input signal - output brightness property of the display apparatus.

48. The picture signal compensation device as set forth in Claim 47, wherein:

the second signal compensation section converts the pixel signal by an inverse function of a function representing the input signal - output brightness property of the display apparatus.

49. The picture signal compensation device as set forth in Claim 42, wherein:

the pixel signal to be employed in the operation for the average signal level is a color video signal which includes a brightness signal representing brightness information of each pixel and a chromaticity signal representing chromaticity information of each pixel.

50. The picture signal compensation device as set forth in Claim 42, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.

51. The picture signal compensation device as set forth in Claim 42, further comprising:

a maximum output brightness adjustment section for performing compensation of the picture signal so that maximum output brightness of a pixel of the display apparatus in accordance with the average signal level.

52. The picture signal compensation device as set forth in Claim 51:

wherein compensation is performed on the picture

signal so that the maximum output brightness adjustment section adjusts maximum output brightness so as to become smaller as the average signal level increases.

53. The image display apparatus as set forth in Claim 51, wherein:

the input signal - output brightness property setting section sets an exponential value in which the input signal - output brightness property is approximately represented by an exponential function, so as to become larger as the average signal level increases, and

the maximum output brightness adjustment section performs compensation of the picture signal so that maximum output brightness becomes smaller as the average signal level increases.

54. The picture signal compensation device as set forth in Claim 51, wherein:

the average signal level operation section performs an operation to obtain an average signal level which is an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel.

55. The picture signal compensation device as set forth in Claim 51, wherein:

the pixel signal to be employed in the operation for the average signal level is a color video signal which includes a brightness signal representing brightness information of each pixel and a chromaticity signal representing chromaticity information of each pixel.

56. The picture signal compensation device as set forth in Claim 51, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.

57. An picture signal compensation device which receives a picture signal including a pixel signal representing information of each pixel, and performs compensation of the picture signal so as to output the pictures signal subject to compensation to a display apparatus having a plurality of pixels, comprising:

an average signal level operation section for performing an operation to obtain an average signal level which is an average level of all the pixel signals; and

a maximum output brightness adjustment section for

performing compensation of the picture signal so that maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level.

58. The picture signal compensation device as set forth in Claim 57, wherein:

compensation is performed on the picture signal so that the maximum output brightness adjustment section adjusts maximum output brightness so as to become smaller as the average signal level increases.

59. The picture signal compensation device as set forth in Claim 57, wherein:

the average signal level operation section performs an operation to obtain an average signal level which is an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel.

60. The picture signal compensation device as set forth in Claim 57, wherein:

the pixel signal to be employed in the operation for the average signal level is a color video signal which includes a brightness signal representing brightness

information of each pixel and a chromaticity signal representing chromaticity information of each pixel.

61. The picture signal compensation device as set forth in Claim 57, wherein:

the picture signal to be employed in the operation for the average signal level is a color video signal including color component signals of three or more primary colors.